



Temperature, comfort and pollution levels during heat waves and the role of sea breeze

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Year: 2010
Journal: International Journal of Biometeorology. 54 (3): 307-317

Abstract:

During the summer of 2007 several Greek regions suffered periods of extreme heat, with midday temperatures of over 40 degrees C on several consecutive days. High temperatures were also recorded on the east coast of central Greece, where a complex sea breeze circulation system frequently develops. The more intense events occurred at the end of June and July. The highest temperatures were observed on 26 June and 25 July, while the sea breeze developed only on 25 July. Meteorological data collected at two sites—a coastal urban location and an inland suburban site that is not reached by the sea breeze flow—as well as pollution data collected at the urban site, were analysed in order to investigate the relationship between sea breeze development and the prevailing environmental conditions during these two heat wave events. The analysis revealed that sea breeze development affects temperature and pollution levels at the shoreline significantly, causing a decrease of approximately 4 degrees C from the maximum temperature value and an increase of approximately 30% in peak PM10 levels. Additionally, several stress indices were calculated in order to assess heat comfort conditions at the two sites. It was found that nocturnal comfort levels are determined mainly by the urban heat island effect, the intensity of which reaches up to 8 degrees C, while the applied indices do not demonstrate any significant daytime thermal stress relief due to sea breeze development.

Source: <http://dx.doi.org/10.1007/s00484-009-0281-9>

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Meteorological Factors, Solar Radiation, Temperature

Air Pollution: Particulate Matter

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Ocean/Coastal, Urban

Geographic Location:

Climate Change and Human Health Literature Portal

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Greece

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

Other Health Impact: heat stress

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified